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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/542,813

07/20/2005

Karine Valle

13777-46

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45473

7590

07/05/2011

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EXAMINER

ARCIERO, ADAM A

ART UNIT

PAPER NUMBER

1727

MAIL DATE

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/542,813	<b>Applicant(s)</b> VALLE ET AL.	
	<b>Examiner</b> ADAM A. ARCIERO	<b>Art Unit</b> 1727	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 29-62 is/are pending in the application.
- 4a) Of the above claim(s) 47-56 and 59-62 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-46 and 57-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

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**CONDUCTIVE ORGANIC-INORGANIC HYBRID MATERIAL COMPRISING A  
MESOPOROUS PHASE, MEMBRANE, ELECTRODE AND FUEL CELL**

Examiner: Adam Arciero

Art Unit 1727

S.N. 10/542,813

June 30, 2011

**DETAILED ACTION**

1. The Applicant's response filed on March 11, 2010 was received. Claims 29-62 are currently pending. Claims 47-56 and 59-62 remain withdrawn from consideration.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 103***

3. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Serpico et al. and Feng et al., as evidenced by Ohlsen et al. on claims 29-46 and 58 are maintained. The rejections are repeated below for convenience.
4. Claims 29-46 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serpico et al. (US 2003/0118887 A1) in view of Feng et al. (Synthesis of polystyrene-silica hybrid mesoporous materials via the nonsurfactant-templated sol-gel process, found in IDS 07/24/2006) and as evidenced by Ohlsen et al. (US 2002/0028372 A1).

As to Claim 29-31, 33-34 and 45, Serpico et al. discloses an organic-inorganic hybrid material comprising two phases, a mineral phase and a material comprising a polymer integrated in said mineral phase and covalently bonded to said mineral phase (pg. 7, [0045]). Serpico et al.

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does not specifically disclose wherein the mineral phase comprises walls which define pores forming a structured mesoporous network.

However, Feng et al. discloses an organic-inorganic hybrid mesoporous membrane comprising a mesoporous silica mineral phase with covalently bonded polymer chains (mesoporous, open-porosity) (pg. 2490, Abstract). Feng et al. further teaches that said membrane can be used as selective membranes (pg. 2490, col. 1), such as ion-selective membranes as those disclosed in Serpico et al. At the time of the invention, it would have been obvious to one of ordinary skill in the art to substitute the mesoporous silica membrane of Feng et al. for that of Serpico et al., because Feng et al. teaches that the membranes are functionally equivalent and one would expect to achieve similar results. Feng et al. further teaches that such a membrane has good mechanical and thermal stabilities (pg. 2490, col. 1).

As to Claims 32 and 44, Feng et al. discloses the use of a surface active agent such as DBTA (Abstract). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the membrane of Serpico et al. and Feng et al., with a surface active agent such as DBTA, because Feng et al. teaches that such an agent contributes to pore formation and the overall mesoporous structured network of the inorganic material (Abstract).

As to Claims 35-36, Serpico et al. discloses wherein the anion exchange groups can be basic aromatic or nonaromatic radicals containing at least one radical selected from imidazole (pg. 6, [0042]).

As to Claims 37-38, Serpico et al. discloses wherein the mineral phase is formed from siloxanes or silanes (pg. 7, [0045]). Feng et al. further teaches of a silica mineral phase material (Abstract).

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As to Claims 39-40, Serpico et al. discloses a co-continuous network formed of the hybrid material (pg. 7, [0045]). Feng et al. teaches a structured mesoporous network with a controlled internal structure (pg. 2492, col. 2). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the membrane of Serpico et al. and Feng et al. so as to have a structured internal network of the inorganic material, because Feng et al. teaches that such a membrane has excellent mechanical and thermal stabilities (pg. 2490, col. 1).

As to Claims 41 and 58, the combination of Serpico et al. and Feng et al. disclose a mesoporous network. However, the prior arts are silent to the pore size ranging from 1 to 100 nm. However, it is known that mesoporous networks have an average pore size of 2 nm to 50 nm, as evidenced by Ohlsen et al. (pg. 7, [0070]).

As to Claims 42-43, Serpico et al. discloses wherein the polymer is a styrene-ethylene polymer (pg. 7, [0047]).

As to Claim 46, Serpico et al. discloses an electrolyte membrane for a fuel cell comprising the material of claim 29, wherein said membrane is placed between two electrodes of the fuel cell, therefore said electrode comprises the material of claim 29.

5. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Serpico et al., Feng et al. and Wu on claim 57 is maintained. The rejection is repeated below for convenience.

6. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Serpico et al. (US 2003/0118887 A1) in view of Feng et al. (Synthesis of polystyrene-silica hybrid mesoporous materials via the nonsurfactant-templated sol-gel process, found in IDS 07/24/2006) and as

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evidenced by Ohlsen et al. (US 2002/0028372 A1) as applied to claims 29-46 and 58 above, and further in view of WU (US 6,465,052).

As to Claim 57, Serpico et al. teaches the use of alumina as an oxide. However, the combination of Serpico et al. and Feng et al. does not specifically disclose wherein the oxide is selected from europium, cerium, lanthanum, gadolinium and mixed oxides thereof.

However, Wu teaches a method to produce a nano-porous coating onto a solid substrate comprising the use of aluminum, europium and gadolinium (col. 1, lines 12-26 and col. 8, lines 20-51). At the time of the invention, it would have been obvious to one of ordinary skill in the art that the use of aluminum is equivalent or exchangeable with the use of europium or gadolinium in forming nanoporous coatings.

### ***Response to Arguments***

7. Applicant's arguments filed April 20, 2011 have been fully considered and are not found to be persuasive.

*Applicant's principal arguments are:*

*a) Serpico discloses a co-continuous network and not a structured mesoporous network with open porosity and Feng et al. is further silent to the claimed limitations (claim 29).*

In response to Applicant's arguments, please consider the following comments.

a) Feng et al. discloses an organic-inorganic hybrid mesoporous membrane comprising a mesoporous silica mineral phase with covalently bonded polymer chains (mesoporous, open-porosity) (pg. 2490, Abstract). Feng et al. is teaching of a mesoporous silica network (structured

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mesoporous network of a mineral phase). Feng et al. further discusses controlling the internal structure of the hybrid mesoporous materials (structured mesoporous network). Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997).

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM A. ARCIERO whose telephone number is (571)270-5116. The examiner can normally be reached on Monday to Friday 7am to 4pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on 571-272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ADAM A ARCIERO/  
Examiner, Art Unit 1727

/Barbara L. Gilliam/  
Supervisory Patent Examiner, Art Unit 1727